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ABSTRACT

In an effort to find a better way to help students make educational and vocational decisions, this study compared two methods of teaching life career planning to junior high school students. Following the "Nonequivalent Control Group" design, the study involved an experimental group being taught by means of the Life Career game and a control group being taught by a teacher-directed method using traditional materials. Pretest and posttest measures of subject content, attitude, and critical thinking abilities were obtained using such instruments as a Semantic Differential, the Life Career Inventory, and the Watson-Glaser Critical Thinking Appraisal. Also a retention test was administered 23 days after the posttest. Based on the analysis of data, a major conclusion of the study included: (1) The Life Career game is no more effective than traditional methods in assisting students to learn subject matter, (2) Simulation is more effective than traditional methods in changing attitudes and for retention of subject matter, and (3) Neither method was effective in improving critical thinking ability. (Author/JS)

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Final Report

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A COMPARISON OF TWO METHODS OF TEACHING LIFE CAREER PLANNING TO JUNIOR HIGH SCHOOL STUDENTS

September, 1971

U.S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
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Abstract

A comparison of two techniques for teaching life career planning to ninth grade students. The experimental group utilized the Life Career game. The control group used the SRA Guidance Series and the Career Information Service series published by New York Life Insurance Company. A Semantic Differential was developed to measure attitude. The Life Career Inventory was used to measure content and the Watson-Claser Critical Thinking Appraisal for ability to analyze and reach conclusions.

The "Nonequivalent Control Group" design was used with four intact classes in each group. The total number of subjects was 235. Pre and post-test measures of subject content, attitude, and critical thinking abilities were obtained. The retention test (Life Career Inventory) was readministered twenty-three days after the post-test.

Analysis of covariance was used with the *t* statistic utilized to test the significance of the null hypotheses.

The conclusions included: The Life Career game is no more effective than traditional methods in assisting students to learn subject matter. Similation is more effective than traditional methods in changing attitudes and for retention of subject matter. Neither method was effective in improving critical thinking ability.

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
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Introduction

One of the biggest problems facing students today is that of trying to make educational and vocational decisions. Many students are no longer willing to accept passively the dictates of their parents, community or socioeconomic class. Some students are willing to accept uncritically the direction of their peers, but many students tend to reject both alternatives. Students need some insights into educational and vocational planning while they are still in school. The traditional teacher-directed method may not be as effective in providing these insights as are games with simulated environments. These games may provide the opportunity for students to experience some of the problems inherent in career choice without the necessity of investing real-life time in order to test career choices.

Statement of the Problem

The problem of this study was a comparison of two methods of teaching life career planning to junior high school students. In this study, the experimental group was taught by means of the Life Career game and the control group was taught by a teacher-directed method using more traditional materials.

Purposes of the Study

The purposes of this study were (1) to compare the ability of the different treatments to increase students' knowledge of life career planning as measured by an instrument developed by Conte; (2) to compare the retention of knowledge of life career planning by experimental and control groups; (3) to compare the ability of the different treatments to change the attitude of the students toward career planning as measured by the semantic differential technique; (4) to compare the ability of the different treatments to improve critical thinking as measured by the Watson-Glaser Critical Thinking Appraisal; and (5) to compare the statements of the experimental and control group students as to whether there is value in this experience relative to making a career choice.

Hypotheses

To carry out the purposes of this study, the following hypotheses were formulated:

1. The experimental group would show a significantly greater knowledge of career planning as measured by adjusted mean post-test scores on the Life Career Inventory (Form LCI-2) than would the control group.

2. The experimental group would show a significantly greater retention of knowledge of life career planning as

measured by adjusted mean difference scores of post- and retention-tests on the Life Career Inventory (Form LCI-2) than would the control group.

3. The attitude of experimental group students toward career planning would show a significantly more favorable attitude as measured by adjusted mean post-test scores on the Semantic Differential than would control group students.

4. The experimental group would show a significantly greater critical thinking ability as measured by adjusted mean post-test scores on the Watson-Glaser Critical Thinking Appraisal than would the control group.

Significance of the Study

Students of American life have been aware for some time of the dislocations in American society caused in part by the wide variety of scientific, technological, and organizational advancements of the past quarter century. Counts[1] pointed out in 1958 that the spreading industrial civilization of the West was producing fear in many people as to whether man was losing control of his destiny.

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[1]George S.Counts, "Education and the Technological Revolution," Teachers College Record, LIX, No. 6 (March, 1958), pp. 309-318.

MacLeish,[2] in writing of American frustrations, echoed Counts when he stated that many Americans fear that somehow we have lost control of the management of our lives and the direction of our affairs.

Diebold[3] believes that as a result of the newly automated information technology a completely new environment will come about, one that will produce great human and social change. In a similar vein, Glass,[4] in writing about the many recent discoveries in the science of genetics, predicts a future in which many values and ethical standards of the present will be questioned and superseded.

Turning to the political realm, Hutchins[5] raises the question of whether democracy as we have known and practiced it will be possible in a society characterized by fantasies of fear of the present and future.

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[2]Archibald MacLeish, "The Great American Frustration, Saturday Review, LI, No. 28 (July 13, 1968), pp. 13-16.

[3]John Diebold, "The New World Coming," Saturday Review, XLIX, No. 30 (July 30, 1966), pp. 17-18.

[4]Bentley Glass, "What Man Can Be," NEA Journal, LVI, No. 6 (September, 1967), pp. 11-14.

[5]Robert M. Hutchins, "Is Democracy Possible?," Saturday Review, XLII, No. 8 (February 21, 1959), pp. 15-17 and 58.

Silberman[6] believes that we must prepare students more adequately for the future and points out that the children who just started school may still be working in the year 2030.

Teachers in our schools are concerned about these problems because they are in daily contact with students who have absorbed the feeling that the future is uncertain and that they may be lost in an increasingly impersonal and automated world. Under these changing conditions, the traditional teacher-directed method of teaching may no longer be adequate.

Years ago Dewey[7] pointed to the need to introduce into the activities of the school those experiences which would prepare the student for real life. Coleman[8] has observed that young children in their informal games are engaged in a crucial task of learning about and experimenting with life. Bruner[9] recommends that schools use "devices for vicarious

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[6]Charles E. Silberman, "How the Public Schools Kill Dreams and Mutilate Minds," Atlantic, 225, No. 6 (June, 1970), pp. 83-96.

[7]John and Evelyn Dewey, Schools of Tomorrow. (New York: E.P. Dutton, 1915), p. 292.

[8]James S. Coleman, "Introduction: In Defense of Games," The American Behavioral Scientist, 10, No. 2 (October, 1966), pp. 3-4.

[9]Jerome Bruner, The Process of Education. (Cambridge, Massachusetts: Harvard University Press, 1960), p. 81.

experiences" in order to involve students in activities that provide them with an opportunity to manipulate their environment. Educational simulations attempt to provide an environment, which although artificial, is realistic and capable of manipulation.

At the present time, very little is actually known about what can best be accomplished through the use of simulations. There are, however, a number of areas in which simulations would appear to be superior to the conventional teacher-directed method. Games are inherently more motivating than the traditional methods of instruction because they introduce the element of competition and winning independent of subject matter. A student does not have to be interested in the subject that the game purports to teach; if the game situation itself is intriguing (and the developer usually tries to see that this is the case) a student may become involved almost in spite of himself. Furthermore, games are still generally considered "non-academic" and the fact that a game is going to be played in the classroom tends to disarm some of the more wary students.

One reason why games tend to be more motivating than the typical teacher-directed instructional situation is because the student-players find themselves manipulating the environment rather than being manipulated by it. Games, then, provide a student with a scaled-down model of the world over which he may exert influence and control. They can serve as a partial

antidote to the passivity that the typical school environment tends to create or reinforce.

Participants in games not only direct and control events; they also receive prompt feedback on the effect that their decisions and actions have had. Other players react to their moves. The "givens" of the world change and the players must take into account the modified circumstances of the world in which they operate. Games provide this feedback automatically and quickly. There is no need to wait for a teacher to provide an evaluation; the student-player not only receives assessments frequently but usually receives them from his peers, which often is more meaningful to the adolescent.

Not only are games active and responsive, they are also goal-directed and provide closure far better than the average textbook chapter. A well-constructed game should have no trouble maintaining attention over a much longer period of time than the conventional printed materials.

Although the goal of an educational game is clear, the outcome is not. The same game may be played many times with an entirely different pattern of interaction and resolution each time. The element of uncertainty lends an aspect of drama to a game that a textbook with its "answers" can never hope to do. Furthermore, games seldom have a "correct" outcome. The outcome is more satisfactory to some players than to others but it is not "right" in the traditional sense.

The fact that educational games usually focus on some real-world problem tends to introduce relevance into the classroom in a way that the conventional approach seldom does. Not only do games tend to be more relevant than traditional methods, they approach problems from the viewpoint of the adult rather than from that of the child. Children read and talk about things that happen; adults participate in and make things happen. This distinction is not lost on students.

Structured peer interactions constitute a fundamental attribute of educational games. Also, teamwork requires that the informal exchanges during play be directed to game issues and strategies. Classroom discipline ceases to be a problem. The energy that tends to get students into trouble is absorbed in the physical activity that often is built into educational games.

All games are competitive to some extent. So is our society. Educational games exploit the competitive tendency in most students and channel it for educational purposes. But American society also has its cooperative side and cooperation is a strong element of the very games that are competitive. Players on one team cooperate among themselves to compete with other teams.

Although there is considerable interest in simulation at this time, there is available only a small amount of research. Even more critical is the fact that much of this research is unrelated. There is little connection of one piece of research

with another and the result is that when a teacher attempts to work with any particular simulation game he often must accept its developer's assertions blindly. Because each simulation is designed for a rather specific use, as yet there has appeared no method by which simulation, per se, can be evaluated.

What is possible, however, is to try to "round-out" the evaluation of games which have been produced commercially, and in all probability, will have fairly wide usage.

At present only two simulation games have received extensive testing. The Inter-Nation Simulation has been used in experiments at the elementary, secondary, and college levels. The present commercially available version of the Life Career game has been tested and reported on at the elementary level. During the development phase it was played by high school age students but not in a school setting. Conte[10] found in his research with sixth graders that pupils who played Life Career showed a significant increase in their knowledge of life career planning. He recommended that further research with the game be carried out at a higher grade level. This study extended the study carried out by Conte to the ninth grade level and compared simulation as a teaching method with a more traditional teacher-directed method of instruction.

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[10]Anthony E. Conte, Games with Simulated Environments: The Use of Life Career with Sixth Grade Students. (Unpublished doctoral dissertation, State University, Pennsylvania: The Pennsylvania State University, 1968).

In addition, attitude change toward life career planning, change in critical thinking ability, and attitude toward the two methods as a valuable experience in career planning was compared. This study added to the existing knowledge about Life Career and provides guidance to prospective users at the ninth grade level, where the game seems particularly appropriate, as to the merits of a simulation as compared with a more traditional teacher-directed method of teaching life career planning. Finally, this study added to the existing body of knowledge about simulation and provided a model by which other simulations may be compared with more traditional teaching methods and materials.

Definition of Terms

For the purposes of this study the following definitions were formulated:

Attitude--a state of readiness exerting a marked influence upon a person's response to objects and situations with which it is related.[11]

Attitude Change--the difference in attitude from the pre-test to the post-test as measured by the semantic differential technique.

Games with Simulated Environments--includes both games which are competitive, with a given set of rules to be followed

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[11]G.W. Allport, "Attitudes in the History of Social Psychology," Attitudes: Selected Readings edited by Marie Jahoda and Neil Warren (Baltimore: Penguin Books, Inc., 1966), p. 20.

by all players and a means of determining a winner or winners, and simulations wherein players adopt roles in a situation which reproduces salient features of a real-life social process.[12]

Knowledge of Life Career Planning--determined by the scores made by students on the Life Career Inventory (Form LCI-2).

Life Career Game--a simulation game developed by Sarane S. Boocock (copyright 1965) The Johns Hopkins University. It simulates certain features of the labor market, the education market, and the marriage market--as they are known to operate in the United States, and as projections indicate they will operate in the future. The purpose of the game is to give students an understanding of these institutions and some experience in planning for their own future. The game is for any number of teams of two to four players and lasts two to six hours. Teams of students act as the decision makers for a fictitious person, each team attempting to plan the most satisfactory life for that person over an eight year, or eight-round period. The teams decide whether their person is going to stay in school or drop out, get a part-time or full-time job, get married, have children; they also decide how much time their person spends for leisure and family responsibilities. Any of the activities requires a certain investment of time, training, money, and so on, and a person clearly cannot engage in all

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[12]Sarane S. Boocock, The Effects of Games with Simulated Environments Upon Student Learning. (Unpublished doctoral dissertation, Baltimore: The Johns Hopkins University, 1966), p. 12.

the available activities. Thus, the players' problem is to choose the combinations of activities that will, in their opinion, maximize the person's present satisfaction and his chances for a good life in the future. Each team fills in a form showing a typical week's schedule during a year in the life of their person; this is given to a scorer, who computes points in four areas: education, occupation, marriage and family life, and leisure. The scorer's spinners and tables are based on recent U.S. census reports and other national survey data; these scoring aids indicate the probability of certain events occurring in a person's life, given his personal characteristics, past experiences, and present efforts. Resource materials are available to the players to aid them in making their decisions; in using them, players become familiar with the format of job handbooks, school catalogs, want ads, and application forms.

Life Career Inventory (Form LCI-2)--an instrument developed by Anthony E. Conte to measure students' knowledge of life career planning.

Simulation--involves the use of role-playing by participants in a situation which reproduces certain aspects of real-life social processes.[13]

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[13]Dale M. Garvey, "Simulation, Role-Playing, and Sociodrama in the Social Studies," The Emporia State Research Studies, XVI (December, 1967), p. 8.

Limitations

Simulation, per se, cannot be studied; one must study examples of simulation. By comparing the Life Career game with a teacher-directed method, inferences may be drawn which may be applicable to other simulations. This study will be limited to the use of the Life Career game because it is the only simulation game presently available in the area of life career planning.

Design of the Study

The design for this study followed one designated by Campbell and Stanley as design number 10, the "Nonequivalent Control Group design.[14] In this design, intact classroom groups are used and one group is designated the experimental group at random by the investigator. Campbell and Stanley[15] have pointed out that the Nonequivalent Control Group design controls for the following internal sources of invalidity: history, maturation, testing, instrumentation, selection, and maturity. The design does not control for the interaction of such extraneous factors as history, maturation, selection, or testing, but Campbell and Stanley have stated that generally such interactions are unlikely.[16]

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[14]Donald T. Campbell and Julian C. Stanley, Experimental and Quasi-Experimental Designs for Research. (Chicago: Rand McNally & Company, 1963), p. 47.

[15]Ibid., p. 40

[16]Ibid., p. 48

The external sources of invalidity mentioned by Campbell and Stanley[17] did not appear to pose a serious threat to the validity of this study. The instruments that were administered were not so unusual as to result in an interaction of testing and treatments. The interaction of selection and the treatments could not be controlled for in the usual sense, but the school district and the school that participated in the study will be described in this chapter in sufficient detail that the reader can estimate the severity of possible selective biases. The final external threat to validity, reactive arrangements, was controlled for by using intact classroom groups, as Campbell and Stanley recommended.[18]

Description of the Sample

Permission to carry out the study at a junior high school during the spring semester, 1971, was granted by the school district in a city of approximately 39,000 population (1970 Census) located within the Standard Metropolitan Statistical Area of Dallas, Texas. The junior high school chosen, one of two in the district, is located in the northwest section of the city, and was opened in the fall of 1968, with a designed capacity of 1000 students. At the time of the study, there were 986 students enrolled. Of this number, 90.5 per cent were Caucasian, 8.5 per cent were Negro, and 1 per cent were of Latin-American descent. Approximately

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[17] Ibid., p. 40

[18] Ibid., p. 50.

43 per cent of the students were transported by the district, including all but two of the Negro students.

The school program basically was an academic one, but there were twenty-five students enrolled in a Coordinated Vocational Academic Education program. Students in the academic program were required to take English and mathematics each year. A wide variety of electives, including offerings in science, art, music, industrial arts, speech, homemaking, and foreign languages, were offered.

There were two full-time counselors at the school, both of whom were fully certified. One counselor had two years of experience and the other counselor had eleven years of experience. One counselor had assumed primary responsibility for seventh graders, the other counselor was responsible for eighth graders, and the ninth graders were split between them. This arrangement was primarily for administrative convenience, however, and each counselor would meet with any students who wished to talk with him, regardless of grade level.

The counselors met with students regularly on a group basis, going into their advisory periods several times during the year, and more frequently on an individual basis. They tried as much as possible to be in the halls during passing periods, before and after school, and after lunch. A number of students, grouped by similarity of syndrome, were worked with by the counselors in a group situation during the school year. Two doctoral students, enrolled in the Group Counseling course

at North Texas State University, spent eight weeks during the spring semester working with the students at the junior high school. In addition, twelve students attended sessions of the Doctoral Counseling Clinic at North Texas State University, and twenty-six students attended sessions operated by the Dallas Independent School District.

Near the end of the fall semester, the principal of the junior high school granted permission to recruit teachers of ninth grade advisory periods to assist in this study.

Advisory periods were daily twenty minute periods immediately following the ninth grade lunch period. They were placed in the schedule originally to serve as a period in which educational and vocational guidance could be taught in a group setting, but they had never been used in that way in a systematic fashion. Most students had been assigned to an advisory section on the basis of their being together in the regular class immediately following the advisory period.

All twelve teachers assigned to ninth grade advisory periods volunteered to participate in the study. It was found that two of these teachers were assigned to advisory period classes in which eighth and ninth grade students were combined, and these two teachers and their classes arbitrarily were excluded from the study. The total number of students participating in the study thus was reduced from 312, the total number of ninth graders enrolled at the beginning of the spring semester, to 270.

Of the remaining ten advisory period sections, two were identified by school authorities as "basic" sections, and eight were classified as "regular" sections. The designation "basic" indicated that the students were having difficulty achieving at a satisfactory level in academic courses due to one or a combination of factors such as reading difficulties, intelligence, motivation, etc. Students in "regular" sections ranged from those who were achieving at a barely satisfactory level to those students who were achieving at a superior level.

In order to balance both basic and regular classes in the experimental and control groups, it was decided to stratify the basic and regular classes, and then assign them randomly to experimental and control treatments. The last names of the two teachers in charge of the basic classes were placed in alphabetical order and then numbered 1-2. It was decided arbitrarily that the first of the two numbers appearing in a table of random numbers[19] would designate the experimental group. The same procedure was followed for the teachers assigned to regular classes. As a result of this procedure, there were one basic and four regular classes each in the experimental and control groups. At this point, the experimental group contained 142 students and the control group

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[19]Allen L. Edwards, Statistical Methods. (New York: Holt, Rinehart and Winston, Inc., 1967), pp. 396-400.

contained 128 students, for a total number of 270. Each group contained one student who was repeating the ninth grade.

From the pre-test to the retention-test, thirty-five subjects were deleted from the study. Absence at the time the pre-tests were given, inability to give students a make-up on the post- and retention-tests, the missing of more than two hours of treatment time, and withdrawal from school were the reasons for this deletion. Of the 235 subjects remaining in the study, 118 were males and 117 were females. However, this nearly equal division between the sexes was not found when the experimental and control groups were compared. There were 44 males and 78 females in the experimental group, while the control group contained 74 males and 39 females. The inbalance in the experimental group occurred because one teacher's group was made up largely of a girl's physical education class of the previous semester, while in the control group one teacher was a shop instructor and his advisory period group consisted exclusively of males.

Of the teachers who participated in the study, two had master's degrees, while the remainder possessed bachelor's degrees. The two teachers with master's degrees were in the experimental group. All teachers were fully certified and teaching in their major field of preparation. Four of the teachers in the experimental group were male and one was female, while in the control group there were two male and three female teachers. The mean number of years of experience for

teachers of the experimental group was 5.5 and 4.8 for the teachers of the control group. The modal (4 years) and median number of years of experience (4) was the same for teachers of each group.

The Measurement Instruments

The Life Career Inventory (Form LCI-2) was used to measure knowledge of life career planning in this study. The test was developed for this purpose by Anthony Conte in conjunction with his study which used the Life Career game at the elementary level.[20] Content validity of this instrument was felt to be adequate in that it was developed by Conte in consultation with Sarane S. Boocock, the originator of the game, and other persons directly involved with the development or revision of the Life Career game. In addition, Conte recommended that the Life Career Inventory (Form LCI-2) be used with further research done in this area.[21] Reliability of the instrument was determined by means of the Kuder-Richardson formula 20 method. With eighty students in the experimental group and the same number in the control group, the Kuder-Richardson 20 coefficient of reliability of the experimental and control group on Form LCI-2 was .852 and .863, respectively.[22]

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[20] Conte.

[21] Ibid., p. 87.

[22] Ibid., p. 61.

Because the ability of students to think critically has been recognized by Bruner[23] and others as an important skill to be developed, it was felt that it would be desirable to determine the difference by which the two treatments increased this ability. The Watson-Glaser Critical Thinking Appraisal (Form YM) was the instrument used for this purpose. This instrument is a five-section power test designed to sample some of the important abilities involved in critical thinking. The first section samples ability to discriminate among degrees of truth or falsity of inferences drawn from given facts or data. The second section samples ability to recognize unstated assumptions in given assertions. The third section is designed to sample the ability to reason deductively from given statements. The fourth section samples the ability to weigh evidence and to d istinguish between unwarranted generalizations and those generalizations which, although not conclusive, are warranted beyond a reasonable doubt. The fifth section is designed to sample the ability to distinguish between arguments which are relevant and important to the question at issue and those which are irrelevant and unimportant.[24] For the purposes of this study it was assumed that the above areas constitute critical thinking ability. The subtest reliability coefficients (split-half odd-even

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[23]Bruner.

[24]Goodwin Watson and Edward M. Glaser, "Manual for Form YM and ZM," Watson-Glaser Critical Thinking Appraisal. (New York: Harcourt, Brace & World, Inc., 1964).

coefficients corrected by the Spearman-Brown formula) are reported to range from .40 to .74.[25]

Attitude change toward life career planning was measured by means of the semantic differential technique. This technique was developed by Osgood and others to measure meaning and has been adapted as an attitude measuring device. Osgood et al.[26] have maintained that by means of the semantic differential technique both direction and intensity of attitude may be measured. In an attempt to establish the validity of the technique, Osgood correlated scores on the evaluative scales of the Semantic Differential with scores on the Thurstone scales on attitude toward The Church, Negro, and Capital Punishment and found the correlations to be .74, .82, and .81, respectively. Test-retest reliability coefficients ranging from .87 to .93 have been reported by Tannenbaum.[27]

In constructing the Semantic Differential instrument for this study, criteria suggested by Osgood were followed. The first step was to select the concept or concepts to be judged. The concepts chosen to be judged in this study were: Education, Occupation, Marriage and Family Life, and Leisure. These were

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[25]Ibid., p. 14.

[26]Charles E. Osgood, George J. Suci, and Percy H. Tannenbaum, The Measurement of Meaning. (Urbana, Illinois: University of Illinois Press, 1967).

[27]Percy H. Tannenbaum, "Initial Attitude toward Source and Concept as Factors in Attitude Change through Communication," Public Opinion Quarterly, XX (Summer, 1956), pp. 413-425.

chosen because these are the areas in which the experimental and control groups received instruction.[28]

The second step was to select the appropriate scales. Osgood[29] recommended two major criteria be used in selecting the scales: (1) factorial composition and (2) relevance to the concepts being judged. In terms of factorial composition, it was Osgood's recommendation that bipolar adjectives (scales) that may be identified as evaluative in nature be used to identify attitude.

In Table I in Joyce's study[30] is shown all the scales used in the present study with the factors around which the pairs tended to cluster in previous factor analyses. The adjective pairs are listed in order of appearance on the Semantic Differential used in the study.

Because the Semantic Differential was to function as an attitude measure in this study, fifteen of the twenty-five bipolar adjectives selected were evaluative in nature, as

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[28]Boocock, The Effects of Games, p. 23.

[29]Osgood, p. 78.

[30]John F. Joyce, A Comparison of Two Methods of Teaching Life Career Planning to Junior High School Students. (Unpublished doctoral dissertation, Denton, Texas: North Texas State University, 1971), p. 85.

determined by previous factor analyses.[31, 32, 33, 34] Osgood[35] suggested that a number of scales representing other factors also be included so as to provide a more balanced semantic space, so three scales representing activity, three scales representing potency, three scales representing novelty, and one scale representing stability were also included in the instrument. Following Osgood,[36] who stated that the investigator must use "good judgment" in selecting the proper scales, all scales in the instrument appeared relevant to the concepts being judged.

A seven-step scale was interposed between the bipolar adjectives. The scale positions were defined for the subjects in the instructions which appeared on the cover sheet of the instrument.

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[31]T. R. Husek and M. C. Wittrock, "The Dimensions of Attitudes toward Teachers as Measured by the Semantic Differential," Journal of Educational Psychology, LIII (October, 1962), pp. 209-213.

[32]James C. McCroskey, "The Effect of the Basic Speech Course on Students' Attitudes," The Speech Teacher, XVI (March, 1967), pp. 115-117.

[33]Raymond G. Smith, "Semantic Differential Dimensions and Forms," Speech Monographs, XXXIII (March, 1966), pp. 17-22.

[34]Tannenbaum, pp. 413-425.

[35]Osgood, p. 78.

[36]Ibid., p. 77.

The format of the instrument followed the method Osgood called Form II. He reported that this form was more convenient for the investigator and more satisfactory to the subject than other forms.[37]

The adjective pairs appeared on the instrument in random order. The polarity of twelve of the twenty-five scales was reversed randomly in order to counteract possible bias tendencies on the part of the respondents, but the ordering of the scales from concept to concept was the same, as recommended by Osgood.[38] A copy of the Semantic Differential appears in the appendix.

A self-report questionnaire was constructed to compare the expressions of experimental and control group students as to whether their activities were a valuable experience in career planning. A copy of the questionnaire appears in the Appendix.

Chronology and Method of Data Collection

On January 21, all teachers involved in the study were introduced to it and given instructions for carrying out the tests and treatments. In general terms, it was explained to them that the purpose of the study was to examine the effectiveness of two different methods of teaching life career

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[37] Ibid., p. 82.

[38] Ibid., pp. 81-82.

planning to junior high school students. The purpose of each of the measurement instruments was explained to them, but they were not informed of the research hypotheses, and they did not know whether they were in the experimental or control sections. It was explained to them that their assignment to groups using different materials was done in random fashion so as to make the groups as alike as possible.

The teachers then were shown copies of the instruments and were instructed in the way answers to the various instruments were to be recorded by the students. Testing and treatment schedules were given the teachers and discussed with them.

The experimental group teachers then were dismissed, and the control group teachers were given the materials they would be using during the study. During this session the teachers were given an opportunity to examine the materials and salient features of the materials were pointed out. The teachers were given an opportunity to ask questions concerning use of the materials.

Control group teachers were told to use the materials in whatever ways they felt would be most effective with their students. They were told that they did not have to make a special effort or try techniques with which they were not familiar or comfortable.

The following day the experimental group teachers met and played one round of the Life Career game so as to acquaint them with the basic operation of the game. At the end of the session,

Data in Table II in Joyce[39] presents the testing schedule from pre-test to retention-test. On the first day of the pre-test, each teacher introduced the study to his students by addressing them as follows:

> One of the tasks of the junior high is to help students explore various areas such as jobs, educational opportunities, marriage and family life, and leisure about which you will have to make decisions in the next few years. Therefore, for the next few weeks our class will be spending its advisory period using some new materials especially designed to help you make plans for the future. The only way we can find out how effective these materials are is to test you before and after you use the materials; therefore, you will be asked to take a number of tests. Some of the questions won't be very easy to understand before you work with the new materials, but please try to do your best on each test. You will not receive a grade for these activities during the next few weeks, but it is important that you do your best because the results of your activities could influence the way school subjects are taught in the future.

After making this statement, each teacher then passed out two IBM answer sheets and a pencil to each student and instructed the class members to fill in the following information at the top of each answer sheet: name, date, age, sex, date of birth, name of teacher, and name of test.

During the following seven school days, the students were tested on the Life Career Inventory (Form LCI-2), the Watson-Glaser Critical Thinking Appraisal (Form YM), and the Semantic Differential.

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[39]Joyce, p. 88.

The treatment phase began on February 9 and continued through March 9, a period of four weeks. The activities of both experimental and control groups during this period are shown in Table III in Joyce.[40]

The experimental group classes used only the Life Career game during this period. The control group classes used a variety of materials chosen to parallel the information conveyed to the experimental group during the playing of Life Career. Ten copies each of twelve booklets from Science Research Associates Guidance Series were packaged into classroom sets and were circulated under the categories of Education, Occupation, Marriage and Family Life, and Leisure to each class in the control group on a weekly basis, as is shown in Table III in Joyce.[41]

Other materials that were circulated to the control group classes were pamphlets from the New York Life Insurance Company Career Information Service series, a Science Research Associates College Occupational Exploration Kit, and a Job Level Table reproduced from the Life Career game Manual. These materials were chosen so that the correct answer to each question on the Life Career Inventory (Form LCI-2) could be found in materials circulated to the control group classes.

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[40] Ibid., p. 90.

[41] Ibid., p. 90.

Experimental group teachers, who had been instructed to allow the Life Career game to carry the instructional burden, reported that they had followed this procedure during the treatment phase of the study. Control group teachers, who had been instructed to teach the materials in any way congenial to them and their students, reported that they had used a variety of methods to teach the materials, including the following: lecture, small group and class discussions, oral reports, panel discussions, and reading in class. All teachers reported that they had refrained from the use and discussion of treatment materials in their regular classes.

At the end of the advisory period on March 9, all materials from experimental and control groups were returned to the investigator. On the following day, the post-test phase began, the activities of which may be seen by referring to Table II in Joyce.[42]

A period of twenty-three days elapsed between the end of the post-test and administration of the Life Career Inventory on April 15 to test the retention of factual information. During this period the teachers of experimental and control groups refrained from discussion of the materials used in the treatment phase of the study.

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[42] Ibid., p. 88.

During the treatment phase absences of students involved in the study were monitored by means of the attendance reports turned in each day by the advisory period teachers and by frequent checks with the teachers. During the post-test and retention-test phases, the answer sheets were checked as they were returned from the teachers, and arrangements were made for a number of students to take make-up tests within a week of the regular test periods.

Students who were absent from class during one or more periods when the pre-tests were being given were given make-up tests using the same instruments, but the scores of these students were excluded when computing the data. Students who were absent from class during one or more periods when the post-tests were being given were given a make-up test using the same instruments. The scores of those students who completed a make-up of the post-test within a week of the regular test period were included in the data, but the scores of those students who did not complete a make-up of the post-tests within a week were excludedwhen the data were analyzed. The scores of students who completed a make-up of the retention-test within a week of the regular test period were included in the data. Those students who had not completed a make-up of the retention-test within a week of the regular test period were not given a make-up test.

Thus, those students who did not take a test at the regular time or within the above mentioned time limits were

excluded from the study. Those students who missed more than two hours of treatment time also were excluded from the study when the data were computed, but they were allowed to participate in class activities so as to avoid possible reactive situations.

Testing activities, exclusive of treatment, took seventeen days. The treatment phase occupied twenty days, or six hours, forty minutes of instructional time.

Statistical Treatment of the Data

In order to identify the evaluative scales of the Semantic Differential used in this study, the following procedures were used:

1. Each scale position of the Semantic Differential was assigned a value from one to seven, depending upon the polarity of the scale. The unfavorable pole was assigned a value of "1;" the favorable pole was given a value of "7;" the middle scale position was assigned a value of "4;" and other scale position values were assigned accordingly.

2. Raw scores resulting from the pre-test were summed over all subjects (N=235).

3. Pearson product-moment coefficients were calculated among the twenty-five scales for each concept. The four resulting tables of intercorrelations were factor analyzed by the principal axes method for the purpose of extracting the evaluative factor.

4. Examination of the factor loadings on all scales revealed that fifteen bipolar adjective pairs clustered around a dimension that was evaluative in nature.

5. The raw scores from these fifteen evaluative scales were included with other data used to test the hypotheses of the study.

Campbell and Stanley[43] have recommended that analysis of covariance be used with the Nonequivalent Control Group design, and that procedure was used in this study.

Possible covariates in this study were pre-test scores, sex, and Otis I.Q.'s derived from scores on the Watson-Glaser Critical Thinking Appraisal. After the data were collected, these covariables were correlatedwith criterion variables, the post-test scores and the difference scores, and coefficients of correlation were calculated. In calculating the correlation between the criterion variables and pre-test and I.Q. scores, the Pearson product-moment method was used. This coefficient may be calculated from the formula:

$$r = \frac{\sum z_x z_y}{N}$$

In calculating the correlation between the criterion variables and sex, the Point Biserial method was used. This

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[43]Campbell and Stanley, p. 49.

coefficient may be calculated from the formula:

$$r_{pbi} = \frac{M_1 - M_0}{\sigma x} \sqrt{pq}$$

where X = the continuous variable

σx = the standard deviation of the continuous variable

M_1 = the X-mean of the group scoring one on the dichotomy

M_0 = the X-mean of the group scoring zero on the dichotomy

p = the proportion of the total group scoring one on the dichotomy

q = the proportion of the total group scoring zero on the dichotomy

After the coefficients of correlation between the criterion variables and the three covariables were calculated, these coefficients were subjected to tests of significance which tested the null hypothesis that the population coefficient was zero. The t-statistic may be calculated from the formula:

$$t = r \sqrt{\frac{N-2}{1-r^2}} \qquad \text{with df=N-2}$$

The calculated value may be compared to the tabled t with N-2 degrees of freedom, where N is the number of pairs of measures. A significant relationship exists of the observed value equals or exceeds the tabled value at the desired level of significance. A two-tailed test was used. The level of significance arbitrarily was set at the 5 per cent level. All covariables that were significant at this level but not highly intercorrelated were used as covariates in testing the hypotheses of the study.

In this study the level of significance below which the hypothesis of equal means would be rejected was set arbitrarily at the 5 per cent level. Adjusted means were calculated and used to test the four hypotheses of the study.

Factor Analysis of Semantic Differential Data

The data generated by a four-concept, 25-scale Semantic Differential were treated by principal axes factor analysis, using program BMD03M at the Computing Center, North Texas State University.

The means and standard deviations of the Education concept and the Occupation concept are shown in Table IV, and the same information for the Marriage and Family Life concept and Leisure concept is shown in Table V in Joyce.[44] The ratings were summed for all subjects involved in the study for each concept evaluated.

Since a separate factor analysis was run for each concept, separate correlation coefficients among the twenty-five Semantic Differential scales and means for each concept were derived. Pearson product-moment coefficients of correlation were computed among the mean ratings of the twenty-five scales used in the evaluation of the four concepts.

Each of the four 25 X 25 matrices of intercorrelation was subjected to a principal axes factor analysis. Factors which had eigen values greater than 1.00 were then

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[44] Joyce.

orthogonally rotated according to the varimax technique. An analysis of the data revealed that none of the evaluative scales had grouped together from concept to concept, so each concept was treated separately.

Under the Education concept, the following nine scales were used: positive-negative, worthless-valuable, good-bad, unpleasant-pleasant, fair-unfair, complete-incomplete, untimely-timely, meaningful-meaningless, and successful-unsuccessful.

Under the Occupation concept, the following three factors were used: unpleasant-pleasant, important-unimportant, and successful-unsuccessful.

The following four scales were used under the Marriage and Family Life concept: happy-sad, untimely-timely, important-unimportant, and successful-unsuccessful.

Ten scales were used in relation to the Leisure concept: positive-negative, discouraging-encouraging, good-bad, happy-sad, nice-awful, interesting-boring, clear-hazy, complete-incomplete, untimely-timely, and meaningful-meaningless.

Covariates

Possible covariates to be used in the study were pre-test scores, sex, and Otis I.Q.'s derived from pre-test scores on the Watson-Glaser Critical Thinking Appraisal. After the data had been collected, these covariables were correlated

with the criterion variables, the post-test and difference scores, and coefficients of correlation were calculated.

These coefficients were subjected to tests of significance which tested the null hypothesis that the population coefficient was zero. A two-tailed test was used, with the level of significance arbitrarily set at the .05 level.

The correlation of possible covariates with criterion variables is shown in Table VI in Joyce.[45] An analysis of these data reveals that pre-test scores on the Life Career Inventory, the Watson-Glaser Critical Thinking Appraisal, and the Semantic Differential were all highly correlated. The covariate, sex, failed to reach significance in four instances, and was barely significant in three instances. The Otis I.Q. was significant in two instances, but failed to reach significance in five instances. Sex and Otis I.Q., therefore, were discarded as covariates because they failed to correlate significantly with the criterion variables.

Next, the intercorrelation of the pre-test scores on the Life Career Inventory, the Watson-Glaser Critical Thinking Appraisal, and the Semantic Differential was examined. The intercorrelation of the covariates is shown in Table VII in Joyce's study.[46] An analysis of these data show a low

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[45] Ibid.

[46] Ibid.

correlation between Semantic Differential scores and scores on the other two instruments. Even though a reasonably high correlation existed between the scores on the Life Career Inventory and the Watson-Glaser Critical Thinking Appraisal, it was decided to retain scores on both instruments as co-variates to insure against making a Type 1 error, even though this increased the chance of making a Type 2 error. The results, therefore, may contain a slightly conservative bias.

Thus, there were six covariates used in the analysis of covariance procedure in this study: the pre-test scores on the Life Career Inventory, the Watson-Glaser Critical Thinking Appraisal, and the four concepts of the Semantic Differential.

Statistical Tests of the Hypotheses

In order to test the four hypotheses of this study, the hypotheses were restated in null form.

Hypothesis 1 was restated to read: There will be no significant difference in knowledge of career planning as measured by adjusted mena post-test scores on the Life Career Inventory (Form LCI-2) between the experimental group and the control group.

A study of Table VIII[47] will show that although the experimental group achieved a higher adjusted mean post-test score on the Life Career Inventory, the difference was not significant at the .05 level. Therefore, Hypothesis 1 in the null form was retained and the research hypothesis was rejected.

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[47] Ibid.

Hypothesis 2 was restated to read: The experimental group will not show a significantly greater retention of knowledge of life career planning as measured by adjusted mean difference scores of post- and retention-tests on the Life Career Inventory (Form LCI-2) than will the control group.

An examination of Table IX[48] will show that the loss of factual information from post-test to retention-test by the experimental group was less than that of the control group, and that this difference was significant at the .03 level. Therefore, Hypothesis 2 in the null form was rejected and the research hypothesis was retained.

Hypothesis 3 was restated to read: The attitude of the experimental group students toward career planning will not show a significantly more favorable attitude as measured by adjusted mean post-test scores on the Semantic Differential than will the control group students.

Subhypothesis 1 of this hypothesis pertained to the Education concept. An examination of Table VIII[49] will show that the attitude of the experimental group was significantly more favorable than that of the control group at the conclusion of the study. Therefore, the null hypothesis was rejected as it pertained to the Education concept and the research hypothesis was retained.

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[48] Ibid.

[49] Ibid.

Subhypothesis 2 of this hypothesis pertained to the Occupation concept. An analysis of the data presented in Table VIII[50] shows that the control group's attitude was slightly more favorable than that of the experimental group, although significance at the .05 level was not reached. Therefore, the null hypothesis was retained as it pertained to the Occupation concept and the research hypothesis was rejected.

Subhypothesis 3 of this hypothesis pertained to the Marriage and Family Life concept. A study of Table VIII[51] will show that the attitude of the experimental group was significantly more favorable than that of the control group. Therefore, the null hypothesis was rejected as it pertained to the Marriage and Family Life concept and the research hypothesis was retained.

Subhypothesis 4 of this hypothesis pertained to the Leisure concept. An examination of Table VIII[52] reveals that the attitude of the experimental group was significantly more favorable than that of the control group at the conclusion of the study. Therefore, the null hypothesis was rejected as it pertained to the Leisure concept and the research hypothesis was retained.

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[50] Ibid.

[51] Ibid.

[52] Ibid.

Hypothesis 4 was restated to read: There will be no significant difference in critical thinking ability as measured by adjusted mean post-test scores on the Watson-Glaser Critical Thinking Appraisal between the experimental group and the control group.

A study of Table VIII[53] will reveal that although the experimental group's adjusted mean score was slightly higher than that of the control group, it did not reach statistical significance. Therefore, hypothesis 4 in the null form was retained and the research hypothesis was rejected.

In response to a question as to whether the activities of the past few weeks had been of value in planning their careers, 78 per cent of the experimental group students reported that the experience had been valuable or quite valuable, and 22 per cent reported that it had been of little value, of no value, or a complete waste of time. Of the control group students, 15 per cent reported that the experience had been valuable or quite valuable, and 85 per cent reported that the experience had been of little value, of no value, or a complete waste of time.

Findings

An analysis of the data bearing on the hypotheses revealed the following:

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[53] Ibid.

1. There was no significant difference in knowledge of career planning as measured by adjusted mean post-test scores on the Life Career Inventory (Form LCI-2) between the experimental group and the control group.

2. The experimental group showed a significantly greater retention of knowledge of life career planning as measured by adjusted mean difference scores of post- and retention-tests on the Life Career Inventory (Form LCI-2) than did the control group.

3. The experimental group showed a significantly more favorable attitude toward the Education, Marriage and Family Life, and Leisure concepts as measured by adjusted mean post-test scores on the Semantic Differential than did the control group. There was no significant difference in attitude toward the Occupation concept between the experimental group and the control group.

4. There was no significant difference in critical thinking ability as measured by adjusted mean post-test scores on the Watson-Glaser Critical Thinking Appraisal between the experimental group and the control group.

5. The experimental group was considerably more enthusiastic about the simulation as a method of teaching career planning than was the control group about the use of traditional methods and materials.

Conclusions

On the basis of the analysis of the results, and within the limitations of the study, certain conclusions are offered with reference to the population studied:

1. The Life Career game is no more effective than traditional teaching methods and materials in assisting students to learn subject matter as measured by the Life Career Inventory.

2. The Life Career game is more effective than traditional methods in helping students to retain subject matter as measured by the Life Career Inventory.

3. The Life Career game is more effective than traditional teaching methods in improving student attitude toward the concepts of Education, Marriage and Family Life, and Leisure, but is no more effective than traditional methods in improving student attitude toward the concept of Occupation.

4. The Life Career game is no more effective than traditional teaching methods in assisting students to improve critical thinking ability. Neither the Life Career game nor the traditional methods and materials materially improved the critical thinking ability of the subjects.

5. The experimental group students responded more favorably to the use of Life Career than did the control group students to the use of traditional methods and materials.

Implications

Even though two of the hypotheses of the study were rejected, and a third hypothesis was not fully supported, certain implications seem in order. However, the inconclusive results strongly suggest that any implications, theoretical or practical, should be considered and accepted with caution.

1. Even though Life Career was not significantly more effective in helping students learn subject matter and improve critical thinking ability, it was at least as effective as a traditional approach, and should be considered as a possible alternative where teacher and student interest indicate a change from traditional methods might be educationally profitable.

2. If used, the Life Career game would be more effective than traditional methods in helping students to retain subject matter. This outcome would be of particular benefit when applied to an area such as life career planning.

3. The greatest strength of the Life Career game as compared with traditional methods and materials may be in its ability to change student attitude toward the concepts of Education, Marriage and Family Life, and Leisure. These are important areas for attitudinal development, and ones in which Life Career may make a significant contribution.

4. The favorable response of the experimental group students to the Life Career game as an aid in career planning indicates that the simulation might be effectively used where students are not responding well to more traditional approaches.

5. Although the use of a control group reduced the possibility of a Hawthorne effect, it is possible that a "novelty" effect existed in that the students in the experimental group had not been exposed to the use of simulation before the study began.

The following recommendations for further research are based on the above findings and implications:

1. The use of the semantic differential technique to measure attitude at the junior high school level should be examined critically.

2. The Life Career Inventory (Form LCI-2) should be further refined with particular attention to the techniques of test construction and grammatical usage.

3. An investigation should be made as to why some students do not like simulation games. A number of studies, including this one, have found that a minority of students tested do not like games.

4. Life Career should be used with inner-city students to determine its effectiveness with students from a different socio-economic background.

5. Parents and their children might play Life Career together, competing against other teams of parents and

children. The effectiveness of this method of making career decisions might be compared with a more traditional one in which students are given career counseling without their parents present.

6. The ability of other simulations to increase knowledge and retention of factual information, change student attitudes, and improve critical thinking ability should be measured. Eventually, an accurate picture of the strengths and weaknesses of educational simulation might be developed.

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APPENDIX

Name_____

Student Questionnaire

Directions: Place a check mark before the phrase that in your opinion best completes the following statement:

As an aid to planning my career, I feel that the activities of the past few weeks were:

_____quite valuable

_____valuable

_____of little value

_____of no value

_____a complete waste of time